

Cows and Fish
Riparian Health Inventory
Lac La Nonne Watershed – Year 2 – Lac La Nonne (2009)
RESULTS HIGHLIGHTS



This highlights of results is created from a presentation prepared for the LEPA Board meeting on July 28, 2010. It is based on field work completed by Cows and Fish in August 2009 on Lac La Nonne. Funding for this project was provided by the Alberta Lottery Fund Community Initiatives Program. Additional support was provided by Lac La Nonne Watershed Stewardship Society, Lac La Nonne Enhancement and Protection Association, Tim Clarke, Alberta Sustainable Resource Development Range Management Branch and Lands Branch, as well as landowners around the lake. The final report is still in progress and therefore these highlights remain DRAFT. These highlights are deemed to be accurate at this time but are subject to change as the final analysis is completed.

RIPARIAN AREAS

Riparian areas are the green zones of water loving vegetation adjacent to a stream, river, lake, pond, wetland or slough. This vegetation is unique to other plants on the landscape because it likes to grow in soils that are saturated with moisture for longer periods in a year. Cattails, bulrushes, sedges, willows and sometimes balsam poplar are all examples of plants that are found in the riparian area.

The riparian area is an ecologically defined zone using clues such as vegetation, soils, topographical and flood prone area. It is not a defined distance from the water and the width can be highly variable even around the same lake. The riparian area may include the part of the shore that is below the “high water mark” or “bank” as well as land above it. The width of these components may vary depending on seasonality and precipitation. Generally, lakefront property owners do not own the portion of the riparian area below the high water mark but can have great influence on how this zone is managed.

The importance of the riparian area to the overall health of a lake is significant. The plant communities and soils within the riparian area are critical for stabilizing banks and shorelines and protecting them from accelerated erosion. They buffer the impacts of floods and high water events by providing friction to lessen the water energy in waves and high flows. Riparian areas are critical habitat for many wildlife species including moose, deer, song birds, waterfowl, insects and fish. They also support our recreation and agriculture industries by creating places for shoreline enjoyment and providing food and shelter for livestock. Riparian areas are also important for filtering runoff that may be carrying pathogens, contaminants or excess nutrients that contribute to problems once in the water column such as increased or more severe algal blooms. The ability of riparian areas to perform these functions is a measure of their health and ecological integrity. Those that are intact are healthy and will provide the best opportunity for improved water quality, water quantity and biodiversity. Those that become altered or damaged by human activities can be unhealthy and the result is reduced benefits to us.

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RIPARIAN HEALTH INVENTORY

Riparian health inventories provide comprehensive information about the diversity, structure and health of plant communities as well as the physical soil and hydrology within the project area. The health inventory establishes an important baseline to compare to in the future, to keep track of whether riparian health is being maintained, improved or is declining.

A riparian health inventory differs from the ‘shorter’ riparian health assessment (survey) because it is a detailed method that more thoroughly examines the vegetative, soil and hydrological parameters of the project area. During a riparian health inventory 79 questions are examined to provide comprehensive and detailed information on riparian function. A health score and rating is derived from this data (Table 1) and breaks information down into nine¹ parameters that are used in this report to discuss the riparian health of lentic waterbodies. Six of the parameters relate to vegetation and three relate to soil and hydrology. By objectively examining each of these health parameters we can determine which pieces are adequately performing the necessary functions of a healthy riparian area, and which are not. This examination provides us with a better understanding of where to concentrate efforts if improvements in riparian management are required, and what land use practices are currently maintaining riparian health.

The riparian health inventory methodology does not involve any in-lake water quality testing.

Table 1 Description of Riparian Health Ratings

<i>Health Category</i>		<i>Score Ranges</i>	<i>Description</i>
Healthy		80-100%	little to no impairment to any riparian functions
Healthy, but with problems		60-79%	some impairment to riparian functions due to management or natural causes
Unhealthy		<60%	severe impairment to riparian functions due to management or natural causes

PROJECT AREA DESCRIPTION

The project area is defined as a selection of riparian areas involving a number of landowners around Lac La Nonne. Representative riparian areas from around the entire lake were inventoried (Table LAL-1). The Lac La Nonne project area includes three municipalities: Barrhead County, Lac Ste. Anne County and the Summer Village of Birch Cove. Lac La Nonne also has several county residential subdivisions, one youth camp (Camp Encounter), one day use

¹ Invasive plants is considered one parameter, however is broken into two parts separating canopy cover and density distribution. Utilisation of woody plants is considered one parameter but is also broken into two parts to take into account browse use by animals and cutting / mowing of woody plants by humans and beavers. Human-caused alterations to physical site is considered one parameter but is also broken into two parts to reflect area impacted and severity.

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area, and several business resorts. Agriculture is a common land use in the uplands of the watershed but is extremely rare along the shoreline. There are sections of shore that are highly developed and dominated by recreation and cottages while other areas remain mostly undeveloped.

Table LAL-1 Project Area Description

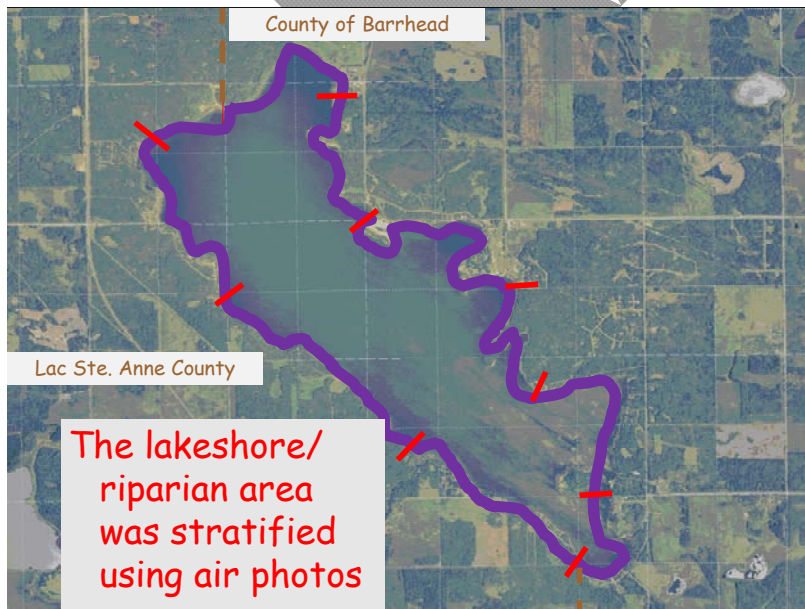
Waterbody	# Landowners Contacted	# Landowners Participated	# Riparian Inventories (Sites)	Shore Distance Inventoried (km)	Shore Distance Represented (km)
Lac La Nonne	14	14	15	4.55	24.5*

*Agriculture and Agri-Food Canada – Agri-Environment Services Branch (formerly PFRA) 2006

The actual shore distance inventoried is 16% of the total shore distance.

SITE SELECTION

Cows and Fish staff stratified the lakeshore using air photos and both boat and foot reconnaissance. We divided the shoreline into reaches (or lengths) that had similar vegetation, physical and land use features (Figure LAL-1). On lakes we also tried to capture windward and leeward parts of the shoreline as well as bays and points. It was estimated that the shoreline was approximately half developed (i.e. greater than 50% of the shoreline altered in some way) and approximately half was undeveloped (i.e. less than 50% of the shoreline altered in some way). Based on the funding available, 15 sites were selected around the lake to represent the stratification. Properties were selected using a combination of volunteer participant sign up sheets as well as random selection and phone calls.



**Figure LAL-1
Lac La Nonne Project
Area Map**

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WHAT DID WE FIND

Fifteen sites were assessed with cooperation from 14 lakefront property owners within the project area. The average riparian health of Lac La Nonne is *healthy, but with problems* (69%) (Table LAL-2) based on the sites we looked at. Due to the small number of sites inventoried these health ratings do not represent the health of the entire Lac La Nonne watershed but do well represent the main shore of Lac La Nonne.

Less than a quarter (20%) of the sites (3 out of 15) rated *unhealthy*. Six (40%) of the remaining sites rated *healthy, but with problems*; and six (40%) rated *healthy* (Figure LAL-2).

Table LAL-2 Vegetative, Soil and Hydrology and Overall Health Scores for All Sites in the Lac La Nonne Project Area

Number of Sites (Polygons) #	Shore Length (km) / Size of Riparian Area (ha) Inventoried	Average			Overall Health Description
		Vegetative Health Score	Soil & Hydrology Score	Overall Health Score	
15	4.55 km / 37.03 ha*	65%	74%	69%	Healthy, but with problems

*size is determined using shore length inventoried and average site width and therefore is an approximate area at best

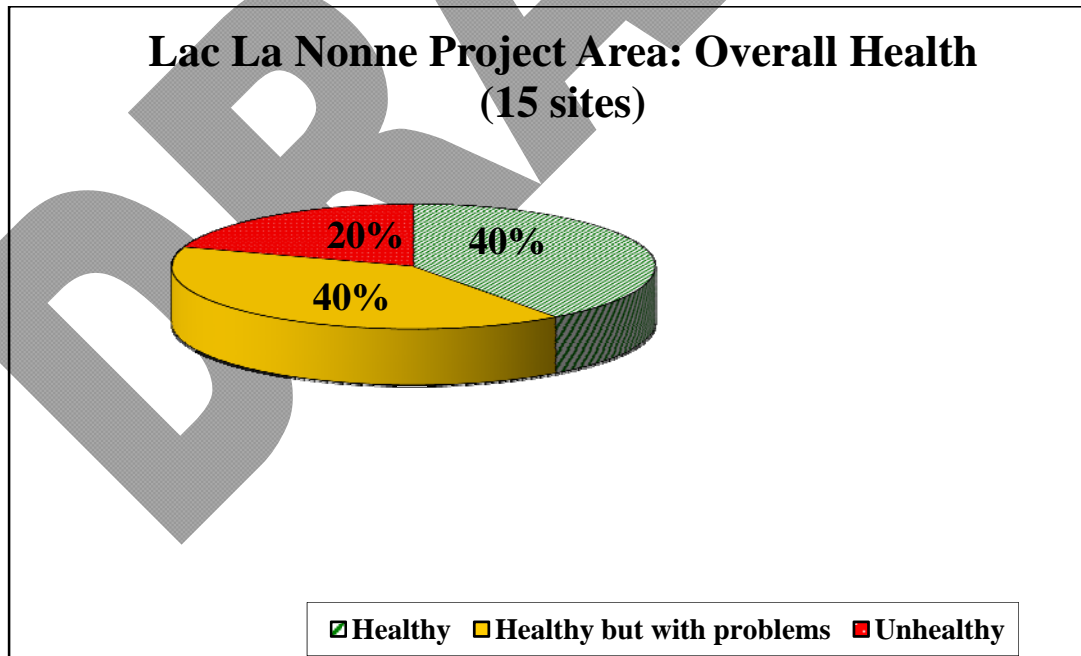


Figure LAL-2 Lac La Nonne Project Area Riparian Health Results (based on an assessment of 15 representative shoreline reaches)

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Of the nine parameters assessed, many of them fall into the *healthy but with problems* category. (Table LAL-3 and Figure LAL-3).

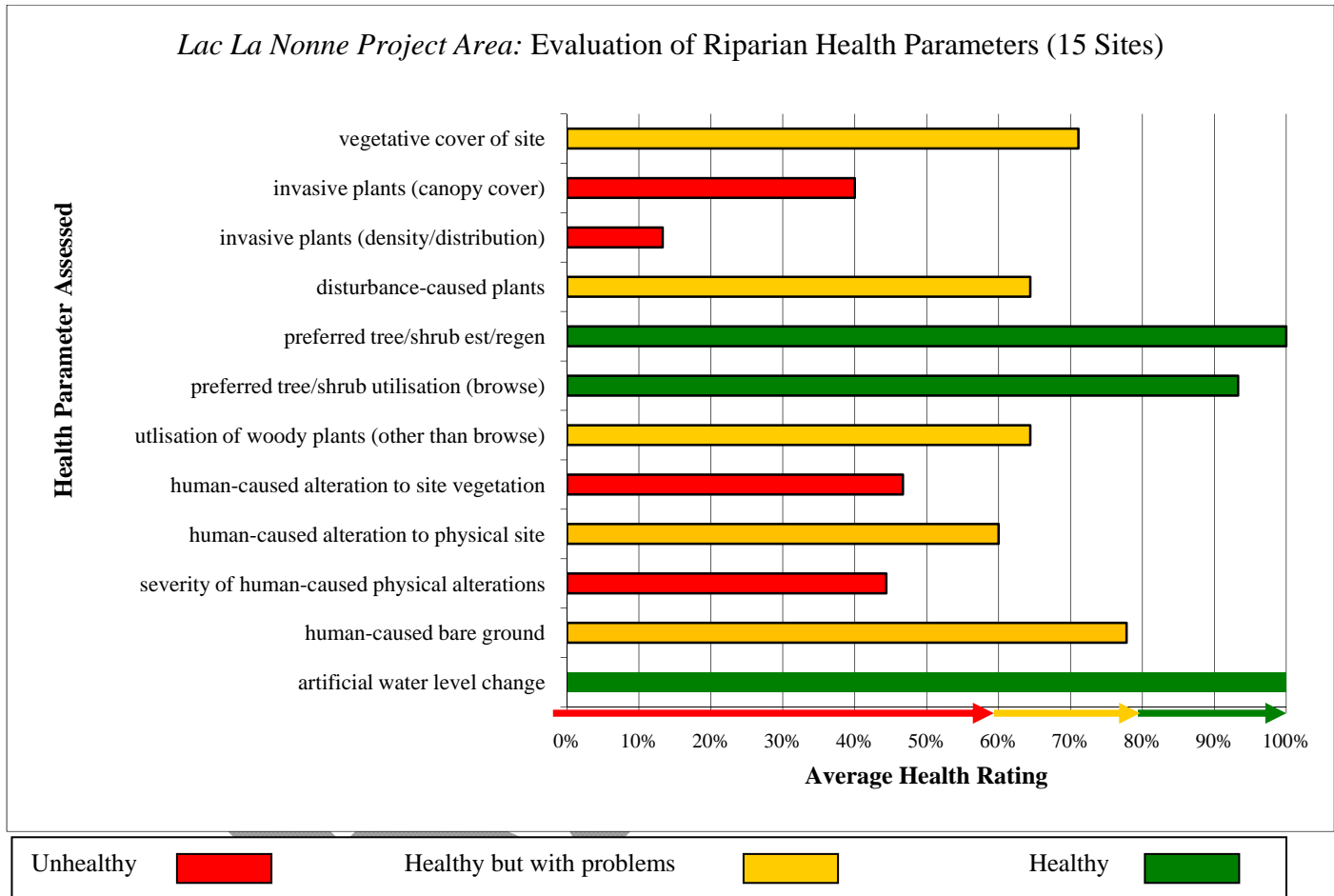


Figure LAL-3 Breakdown of Riparian Health Parameter Ratings for Lac La Nonne

Table LAL-3 Riparian Health Parameter Summary for Lac La Nonne Project Area

Parameters that are:	<i>Healthy</i>	<i>Healthy but with Problems</i>	<i>Unhealthy</i>
- preferred tree and shrub establishment and regeneration	- browse utilisation of available preferred trees and shrubs	- degree of artificial water level change	- vegetative cover
			- disturbance-caused plants
			- woody vegetation removal by other than browse
			- human-caused alteration to site physical structure
			- human-caused bare ground
			- invasive plants (canopy cover & density and distribution)
			- human-caused alteration of site vegetation
			- severity of human-caused alterations to site physical structure

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Parameter Highlights

Vegetative Cover – Healthy but with problems

Most sites had adequate vegetative cover and on average greater than 85% of the shoreline inventoried was vegetated. There were a few sites that were lacking vegetation cover due to natural or human causes. Those with natural drawdown could have a lower rating in this parameter because there is still exposed, unvegetated soil but we recognize that this is a natural fluctuation in the system. However, the unvegetated area is still susceptible to erosion and invasion by non-native plant species.

There was excellent plant species diversity found along the shoreline. A total of 157 plant species were identified. Of these species, 6 were trees, 37 were shrubs, 29 were grass and grass-like and 91 were forbs (broad-leaf plants).

Invasive Plants – Unhealthy

All sites had some invasive plants on them. These are plants identified by the Alberta Weed Control Act as noxious or restricted weeds. There were no restricted or prohibited noxious weeds found but six noxious weeds were observed. The most abundant and common was Canada thistle followed by smooth/perennial sow thistle. Scentless chamomile, white cockle and common tansy were also found but were less abundant and less common. However, they should not be overlooked because likely they are present now in manageable quantities. Lake front property owners are encouraged to work with their local Sustainable Resource Development office and the County to determine the best course of action to deal with noxious weeds on the shoreline and on your property.

Disturbance Caused Plants – Healthy but with problems

Disturbance-caused plants are ones that tend to have shallow roots and are generally introduced species that are not native to Alberta. A total of 20 disturbance-caused plants were observed in the Lac La Nonne project area, five were grasses or grass-like and 15 were forbs (broad leaf plants). Common dandelion and alsike clover were the most common and abundant but grasses such as Kentucky bluegrass were also present and are less capable of performing many riparian functions than the native species. Disturbance grasses and invasive weeds do not have the mass of root material that aids in keeping shorelines or banks intact. As a result of replacing native vegetation with introduced species either by seeding/planting them directly or by encroachment the reaction is often to try to shore up the bank with riprap or concrete in order to prevent erosion.

Despite the presence of these disturbance-caused plants, native species still remain abundant. One species of sedge (awned sedge) is the most abundant then common great bulrush, cattail, bluejoint, cattail, balsam poplar and willow (pusy).

Preferred Tree and Shrub Establishment and Regeneration – Healthy

Tree and shrub establishment and regeneration refers to the proportion of seedlings and saplings present in relation to the mature plants. If regeneration is sufficient it ensures replacement of the

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older stands. This only looks at the preferred species of shrub (willow, red-osier dogwood etc.) This doesn't include snowberry, silverberry and rose because these species tend to increase when grazed heavily. When seedlings and saplings are absent there isn't the young age class to replace the mature stands when they get older and die out. The shorelines of Lac La Nonne have good amounts of young woody plants at this time. How extensive these plant communities can become will depend on water levels and management.

Preferred Tree and Shrub Utilisation (Browse) – Healthy

The browse pressure is none with 0-5% of the second year and older leaders being browsed by large ungulates including livestock. Any browse we did see is from wildlife.

Woody Vegetation Removal by Means other than Browse – Healthy but with problems

Woody removal by other means, refers to cutting or clearing of trees and shrubs by human or it could also mean beaver activity. If this is a small amount of the expected woody vegetation on the site, the score will not be negatively affected, however if it's a large proportion of the area the rating becomes lower relatively. The *healthy but with problems* rating means that the overall impact of woody removal by means other than browse is light (5-15% of what is expected to be there has been removed).

Alteration to the Vegetation by Human Activities – Unhealthy

Human alteration to riparian site vegetation refers to an actual change in the vegetative community. It may be a change in species composition such as from native to introduced species. Or it could be a change from a woody community to a forb and grass community. The most extreme alteration is complete removal. Alteration does not take into account one year of grazing or use on its own because if managed properly the plant community should remain intact. On average >15% of the inventoried area vegetation is altered from its natural state in the Lac La Nonne project area.

Alteration to the Physical Structure of the Riparian Area by Human Activities – Healthy but with problems

Physical alterations are things like landscaping, grading, adding rock or sand, hardening of the natural soil structure with concrete or rock, or damaging the shoreline with ruts. On average between 15 & 35% of the inventoried area suffers from these alterations. The effects of these alterations are soil compaction which reduces infiltration of water and threatens the water table and the potential for increased erosion.

Severity of Human-Caused Physical Alterations – Unhealthy

Although the average rating for this parameter is *unhealthy*, we can describe it as somewhere between slight and moderate severity of the human-caused alterations to physical structure that exist. **Slight**—Physical site integrity is near natural. Human-caused alteration (including recovery from any past severe alterations) is apparent, but reflects minimal impact to plant communities and hydrological function in the altered areas (e.g., the plant community is little changed from that on nearby sites lacking physical alteration; any pugging and hummocking or other disruption of the soil profile is relatively shallow and is well vegetated with appropriate

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species). **Moderate**—As compared with nearby unaltered sites, human-caused physical alteration on the polygon (including recovery from any past severe alterations) has noticeably altered the physical site integrity to the point that plant communities and hydrological function on the altered areas show visible impact. The plant community differs noticeably (by having introduced or missing components) from nearby sites that are on similar landscape position and that lack physical alterations. Pugging and hummocking or other disruption of the soil profile is moderate in depth and height of hummocks. Such alteration is either becoming re-vegetated with appropriate species, or is well covered with a mix of less desirable and appropriate species.

Human-Caused Bare Ground – *Healthy but with problems*

This is bare ground created by human activity. There is a small to moderate amount of this exposed soil within the project area and varies greatly among sites. Recreational activity (eg quad trails, walking trails, any activity that results in removal or wearing down of vegetation to create bare soil) or and cottage development (eg building) would be the causes of what h-c bare ground there is. The impacts of these are primarily soil compaction and interruption of the natural shoreline structure integrity such as by plowing or tilling. The *healthy but with problems* rating means that on average between 5 and 15% of the inventoried area has this type of bare ground.

Degree of Artificial Water Level Change – *Healthy*

Maintaining lake levels at a higher than “normal” level for the season is considered a manipulation of the natural fluctuation and variation that occurs within a lake. Draining or with drawing water from a lake that may result in lower than “normal” seasonal levels is also a manipulation and can negatively affect the overall riparian health of the waterbody. Lac La Nonne does have a water control structure on the McDonald Creek outlet however, at the time of the inventory the weir / rock dam on the outflow creek is not a factor because the water level is well below the level that it may be influential. This rating could change in future years depending on water level differences. To our knowledge there are no water licences on the lake and though we did hear of people taking water out of the lake for their personal use it was not observed and is likely not enough to affect the water level due to the size of the lake. A water body or wetland is subject to no more than minor artificial water level change if the shore area remains vegetated, and withdrawal of water is limited or slow enough that vegetation is able to maintain growth and prevent soil exposure. A relatively narrow band affected by the water level fluctuation may support only annual plants.

NEXT STEPS and WHERE EFFORTS CAN BE FOCUSED

It is the combined influence of all of these parameters that provides us with the snapshot of riparian health and function for Lac La Nonne. With this riparian health inventory individuals have a report that outlines their rating along with aspects of health for improvement and those that should be maintained. The LWSS will also receive a final overview report to share with its stakeholders/partners that describes the project area and results by averaging the results of all of the sites completed on Lac La Nonne without sharing any individual site information.

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Areas of riparian health that can be focussed on as individuals and as a community include:

- **Monitoring and control of invasive plants.** Such activities as removing the flowers before they go to seed and maintaining other native vegetation can help reduce the spread of these undesirable plants. Invasive plant management is a watershed issue as well as a local issue and residents around the lakes are encouraged to work with their neighbours, the Counties and Sustainable Resource Development to address invasive plant concerns.
- **Maintain and promote the presence and establishment of preferred/native trees and shrubs.** There is already a good base of young and established woody plant communities around much of Lac La Nonne. Maintaining existing woody plant communities is key to the future riparian health of the lake as well as for health of songbird and wildlife populations. Encouraging residents to restore native trees and shrubs where they have been removed not only along the shoreline but in the yard as well would be positive for long term riparian health.
- **Reduce human alterations to vegetation and physical structure.** Continuing to educate residents on the alternatives to complete removal or modification of natural shoreline is an important aspect of riparian management. For a healthy riparian area there are “allowable limits” of disturbance or alteration that can occur and still maintain a functional riparian zone. Working with people to understand these thresholds is important for improving and maintaining riparian health around Lac La Nonne.

If you have any questions about this highlights report, please contact Kerri O’Shaughnessy, Riparian Specialist, Cows and Fish by phone at 780-427-7940 or by email koshaugh@cowsandfish.org.